SIEMENS

ACOM.PC ® 6.0
ACOM.REC ® 4.0

AX

DICOM Conformance Statement

V1.0 17-Oct-07

All rights reserved

© Siemens AG, Medical Solutions 2007,
Siemensstr. 1, D-91301 Forchheim, Germany

Headquarters: Berlin and Munich
Siemens AG, Wittelsbacherplatz 2, D-80333 Munich, Germany

Printed in the Federal Republic of Germany
Release 10.07

Network Conformance Statement

1 Conformance Statement Overview

The ACOM.PC is a software application for viewing images derived from Cardiac Diagnostic and Interventional Procedures. The ACOM.PC is designed to be integrated into an environment of Medical, DICOM-based devices in the Cardiac Lab. The ACOM.PC supports Storage and Transfer of images utilizing the DICOM “Storage Service Class”, the display of data and retrieval of images from DICOM Archives utilizing the DICOM “Query/Retrieve Service Class”. Furthermore the Import of images from DICOM Cardiac and X-Ray Angiographic media is supported. The Siemens product ACOM.REC is an application to write images from the Siemens ACOM.PC product onto DICOM CDs or DICOM DVDs. The ACOM.PC supports the storage of images utilizing the DICOM XA, SC, US, USMF, NM and WF IODs.

SOP Classes	SOP Class UID	SCU	SCP
Verification			
Verification	1.2.840.10008.1.1	Yes	Yes
Transfer			
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	Yes	Yes
Ultrasound Multi-Frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	Yes	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	Yes
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	Yes
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Yes	Yes
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	Yes
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	Yes
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	Yes
Transfer (Ultrasound)			
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
Transfer (Private SOP Class)			
Syngo Non-Image Storage	1.3.12.2.1107.5.9.1	Yes	Yes
Query/Retrieve			
Study Root Q/R - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Q/R - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

Table 1. Network Services

Name	Value
Application Context Name	1.2.840.100008.3.1.1.1
Implementation Class UID	1.3.12.2.1107.5.4.9.40
Implementation Version Name	“ACOM_PC_501"

Table 2. Implementation Identifying Information

2 Table of Contents

1 Conformance Statement Overview 2
2 Table of Contents 3
3 Introduction 5
3.1 Revision History 5
3.2 Audience 5
3.3 Remarks 5
3.4 Definitions, Terms and Abbreviations 5
4 Networking 7
4.1 Implementation Model 7
4.1.1 Application Data Flow 7
4.1.2 Functional Definitions of Application Entities 8
4.1.3 Sequencing of Activities 9
4.2 Application Entity Specification 10
4.2.1 Verification SCU AE Specification 10
4.2.2 Storage SCU AE Specification 12
4.2.3 Storage SCP AE Specification 15
4.2.4 Retrieve SCU Specification 18
4.3 Network Interfaces 23
4.3.1 Physical Network Interface 23
4.3.2 Additional Protocols 23
4.4 Configuration 24
4.4.1 AE Title/Presentation Address Mapping 24
4.4.2 Controlling “Examination Split” 24
4.4.3 Parameters 24
5 Application Profile Conformance Statement 26
5.1 Implementation Model 26
5.1.1 Application Data Flow Diagram 26
5.1.2 Functional Definitions of AEs 27
5.1.3 Activities 27
5.1.4 Implementation Identifying Information 27
5.2 AE Specifications 28
5.2.1 DICOM Archive Specification 28
5.3 Application Profiles 30
5.3.1 DICOMDIR Keys 30
5.3.2 Standard Application Profiles 34
5.3.3 Augmented Application Profiles 35
5.3.4 Private Application Profiles 36
5.3.5 Anonymizing of patient data 37
5.4 Extensions, Specializations and Privatizations of SOP Classes and Transfer Syntaxes 39
5.4.1 SOP Specific Conformance Statement for Basic Directory 39
5.4.2 Standard Extensions of XA Storage SOP classes 39

5.5 Configuration 41
5.5.1 Dynaview Image handling 41
5.5.2 AE Title Mapping 41
6 Support of Extended Character Sets 42
Annex A: SC Image by ACOM.PC Viewer 43
Annex B: Index of Tables 44

3 Introduction

3.1 Revision History

Product	Product Version	Document Version	Date	Description
ACOM.PC	6.0	V1.0	17-Oct-07	Final Text
ACOM.REC	4.0	V1.0	17-Oct-07	Final Text

Table 3. Revision History

3.2 Audience

This document is intended for hospital staff, health system integrators, software designers or implementers. It is assumed that the reader has a working understanding of DICOM.

3.3 Remarks

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality as SCU and SCP, respectively.

This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended.

The scope of this Conformance Statement is to facilitate communication with Siemens and other vendors' Medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM 3.0 Standard [DICOM]. However, by itself it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues:

- The comparison of different conformance statements is the first step towards assessing interconnectivity between ACOM.PC and other DICOM-conformant equipment.
- Test procedures should be defined and tests should be performed to validate the connectivity desired. DICOM itself and the conformance parts do not specify this.

3.4 Definitions, Terms and Abbreviations

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard. Furthermore, the following definitions are applicable in this document:

Online storage - Images immediately accessible on an online RAID-cluster.

Near-line storage – Images from online storage copied onto Archive-System (e.g. MOD-/ CDR-Jukebox or external DICOM Archive). Images have to be copied back to online storage before access via DICOM Standard Interface is possible.

Offline storage - An archive medium containing the Images exists, but is removed from the near-line storage and therefore access is only possible via operator interaction.

Additional Abbreviations and terms are as follows:

AE	DICOM Application Entity
AET	Application Entity Title
ASCII	American Standard Code for Information Interchange
DICOM	Digital Imaging and Communications in Medicine
DSA	Digital Subtraction Angiography
FSC	File Set Creator
FSR	File Set Reader
FSU	File Set Updater
IOD	DICOM Information Object Definition
ISO	International Standard Organization
MOD	Magneto-optical Disk
O	Optional Key Attribute
PDU	DICOM Protocol Data Unit
R	Required Key Attribute
SCU	DICOM Service Class User (DICOM client)
SCP	DICOM Service Class Provider (DICOM Server)
SOP	DICOM Service-Object Pair
U	Unique Key Attribute
UID	Unique Identifier
VR	Value Representation

4 Networking

4.1 Implementation Model

- **Verification**
  The ACOM.PC Server DICOM Service Tool application requests Verification to proof the ability of a remote DICOM application to respond to DICOM messages. Responding to Verification requests from remote nodes is handled by the Storage SCP.

- **Storage**
  The ACOM.PC client is able to initiate associations for Storage of DICOM Composite Information Objects to Remote AEs and to receive and respond to associations for Storage from Remote AEs.

- **Query/Retrieve**
  The query/retrieve service class defines an application-level class of services which facilitates the management of images and patient data. The ACOM.PC Server DICOM application supports the query/retrieve services in a SCP role. In case a DICOM Archive is configured as near-line storage, ACOM.PC supports Query/Retrieve internally as SCU to retrieve IODs to online.

4.1.1 Application Data Flow

The division of ACOM.PC into the separate DICOM Application Entities represents a somewhat arbitrary partitioning of functionality. For the purpose of this document they are organized in this manner to detail their independent logical functionality.

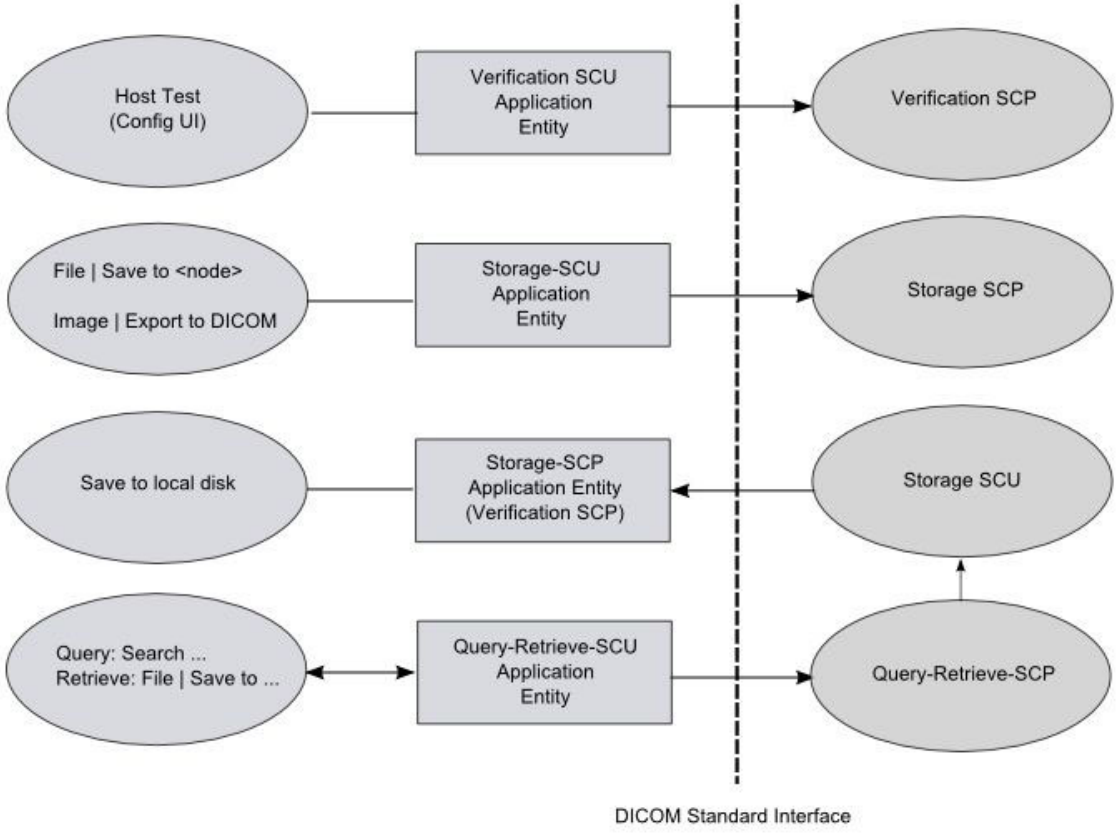

Table 4. ACOM.PC DICOM Data Flow Diagram

- The ACOM.PC DICOM Service Tool application opens an association when a "Test" of a remote application is requested during a configuration session. This can be done when entering new data to configure a remote application or to verify existing configuration data.

- The Storage SCU AE can send Composite SOP Instances.

- The Storage SCP AE can receive incoming DICOM images and add them to the local database. It can respond to external Storage and Verification Requests as a Service Class Provider (SCP) for C-STORE and C-ECHO requests.
  The Storage SCP AE only supports image type Composite SOP Instances as indicated in Chapter 1 Conformance Statement Overview.

- The Query part of the Query/Retrieve SCU AE uses C-FIND to search a DICOM Database for Patient Study and Series information.
  The Retrieve part of the Query/Retrieve SCU AE uses C-MOVE to initiate a DICOM transfer of composite objects to the local database.

4.1.2 Functional Definitions of Application Entities

4.1.2.1 Functional Definition of Verification-SCU AE

The ACOM.PC product supports the DICOM Verification service as SCU. With the “Host Test” utilities it is possible to open an association to the remote application and send a Verification message to verify that the remote application can respond to DICOM messages. This Service is only available during configuration.

4.1.2.2 Functional Definition of Storage-SCU AE

The ACOM.PC product supports the DICOM Storage service as SCU. For each selected patient in the Browser application it opens an association to the remote application and sends the images. From the Viewer, single images can be sent to a remote DICOM destination directly.

4.1.2.3 Functional Definition of Storage-SCP AE

The Storage SCP is operating as a background daemon process. It is active as long as the application is running or jobs are active. The received objects are stored to Local Disk. They can be further processed or transferred to other destinations.

The Verification SCP is included in the Storage SCP.

4.1.2.4 Functional Definition of Query/Retrieve-SCU AE

The ACOM.PC product supports the DICOM Query and Retrieve service as SCU. It opens one or more associations to a remote application and queries for database information or a single association to retrieve the images of a selected study or exam (group of series).

4.1.3 Sequencing of Activities

4.1.3.1 Verification

The ACOM.PC application provides configuration pages for the device and remote DICOM nodes. A “Host Test” button is provided to check for a configured remote DICOM node. Pressing the button, ACOM.PC will issue a Verification Request (C-ECHO) and a Query Request (C-FIND) subsequently.

4.1.3.2 Storage

The ACOM.PC application provides a User Interface to select patients or examinations from the Browser and send them to remote DICOM nodes. From the Viewer selected Images or Ref Images can be sent.
Some destinations require that the related images are already stored on the local disk in advance to the initiation of further transfers of those images.

Only while displaying images, the actual displayed image can be sent out from ACOM.PC viewer.

If available and referenced by the related Patient record within the local DICOMDIR, the contents of the referenced Detached Patient Management Instance is applied to the image header before sending it to a destination. New UIDs will be created in this case on Study-/Series- and SOP Instance-Level.

Note: ACOM.PC is not intended for use with dial-up connections.

4.1.3.3 Query/Retrieve

The ACOM.PC application provides “Edit|Search...” User Interfaces to query a remote node for its patient information (with or without explicit query criteria) and display it in an exam list.

With “File|Save…” the content of one or more examinations from the previously queried list is requested to be retrieved from the remote DICOM node. The related instances are stored on the location defined by the “Save...” target (e.g. "Local").

4.2 Application Entity Specification

4.2.1 Verification SCU AE Specification

4.2.1.1 SOP Classes

For SOP Classes supported, please refer to Table 1 "Network Service" Section "Verification" on page 2.

4.2.1.2 Association Policies

4.2.1.2.1 General

The ACOM.PC DICOM Configuration Utility attempts to open an association for verification request whenever the “Host Test” function is activated during network configuration of a remote DICOM application.

4.2.1.2.2 Number of Associations

The ACOM.PC Server DICOM Service Tool application initiates one association at a time to request verification.

4.2.1.2.3 Asynchronous Nature

The ACOM.PC Server DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

4.2.1.2.4 Implementation Identifying Information

For Implementation Identifying Information please refer to Table 2 "Implementation Identifying Information" on page 2.

4.2.1.3 Association Initiation Policy

4.2.1.3.1 Activity – Request Verification “Test”

4.2.1.3.1.1 Description and Sequencing of Activity

The Verification SCU C-ECHO request is initiated by Service and Configuration SW whenever a "Host Test" is requested. If an association to a remote Application Entity is successfully established, Verification with the configured AET is requested via the open association. If the C-ECHO Response from the remote Application contains a status other than "Success" this will be indicated in the service environment and the association is closed.

4.2.1.3.1.2 Proposed Presentation Contexts

The ACOM.PC Server DICOM application will propose Presentation Contexts as shown in the following table:

Presentation Context Table – (Host) Test					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 5. Presentation Context Table “Verification”

4.2.1.3.1.3 SOP Specific Conformance – Verification SCU

The Application conforms to the definition of the Verification SCU in accordance to the DICOM Standard.

4.2.1.4 Association Acceptance Policy

The Verification SCP is part of the Storage SCP

4.2.2 Storage SCU AE Specification

4.2.2.1 SOP Classes

For SOP Classes supported, please refer to Table 1 "Network Service" Sections „Transfer“ on page 2.

4.2.2.2 Association Policies

4.2.2.2.1 General

The ACOM.PC Application attempts to open an association for storage request whenever the “File | Save to (Network Node)” function is activated within the Browser or Viewer.

The default PDU size used will be 256 KB.

4.2.2.2.2 Number of Associations

The ACOM.PC DICOM application initiates several associations at a time, one for the selected images of each patient to be transferred.

4.2.2.2.3 Asynchronous Nature

The ACOM.PC Server DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

4.2.2.2.4 Implementation Identifying Information

For Implementation Identifying Information please refer to Table 2 "Implementation Identifying Information" on page 2.

4.2.2.3 Association Initiation Policy

With each request the ACOM.PC DICOM application attempts to initiate a new association for

- DIMSE C-STORE

service operations.

4.2.2.3.1 Activity – File|Save to|<node>

4.2.2.3.1.1 Description and Sequencing of Activity

The C-Store request is initiated by User Interface of the ACOM.PC application. If the process successfully establishes an association to a remote Application Entity, it will transfer each image one after another via the open association. If the C-STORE Response from the remote Application contains a status other than Success or Warning the association is aborted.

4.2.2.3.1.2 Proposed Presentation Contexts

The ACOM.PC DICOM application will propose Storage SCU Presentation Contexts as shown in the following table:

Presentation Context Table – “File Save”				
Abstract Syntax	Transfer Syntax		Role	Ext. Neg.
Description	Name List	UID List		
Any image SOP Classes detailed in Chapter Table 1 "Network Service" Section „Transfer“ on page 2	JPEG Lossy Extended JPEG Lossless, Process 14 (selection value 1) JPEG Lossy Baseline (Process 1) Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None
Any image SOP Classes detailed in Chapter Table 1 "Network Service" Section „Transfer Ultrasound“ on page 2	JPEG Lossy Extended JPEG Lossy Baseline (Process 1) Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian RLE lossless	1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2 1.2.840.10008.1.2.5	SCU	None
Any Non-Image SOP Classes detailed in Table 1 "Network Service" Section „Transfer“ on page 2, e.g. Waveforms	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None
Private SOP Class detailed in Chapter Table 1 "Network Service" Section „Transfer (Private SOP Class)“ on page 2	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None

Table 6. Presentation Context Table “File Save”

4.2.2.3.1.3 SOP specific Conformance

The DICOM images sent by the ACOM.PC application may contain additional private elements, which have to be discarded by a DICOM system when modifying the image.

The DICOM nodes are responsible for data consistency when modifying images. All unknown private attributes have to be removed upon modification!

“Precedence of Value” is applied to the image header prior to send, if a related Detached Patient Management Instance exists and is applicable by reference. New UIDs will be created in this case on Study-/Series- and SOP Instance-Level.

ACOM.PC will not change Transfer Syntaxes when trying to send out RLE or JPEG lossy images. If a DICOM SCP cannot handle RLE or JPEG lossy compression then ACOM.PC will not send those images.

4.2.2.3.2 Activity – Image|Export|”to DICOM"

4.2.2.3.2.1 Description and Sequencing of Activity

The C-Store request is initiated by User Interface of the ACOM.PC application. The image is processed and encoded as a SC Image and forwarded to the send process. If the process successfully establishes an association to a remote Application Entity, it will transfer the image via the open association. If the C-STORE Response from the remote Application contains a status other than Success or Warning, the request is indicated as failed.

4.2.2.3.2.2 Proposed Presentation Contexts

The ACOM.PC DICOM application will propose Storage SCU Presentation Contexts as shown in the following table:

Presentation Context Table – "Image Export"				
Abstract Syntax	Transfer Syntax		Role	Ext. Neg.
Name (UID)	Name List	UID List		
Secondary **C**aptured Image Storage Service Class (1.2.840.10008.5.1.4.1.1.7)	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None

Table 7. Presentation Context Table "Image Export"

4.2.2.3.2.3 SOP specific Conformance

The ACOM.PC viewing application will create a SOP Instance based on the SC IOD. The image is processed as it is displayed, with the exception that filtering and compression is not applied on the pixel-data. Matrix Size and Photometric Interpretation are preserved from the original image pixel.

"Precedence of Value" is applied to the image header prior to send, if a related Detached Patient Management Instance exists and is applicable by reference. New UIDs will be created in this case on Study-/Series- and SOP Instance-Level.

Please see the Annex for detailed description of the created SC object's data.

4.2.2.4 Association Acceptance Policy

The Acceptance Policy will be described within Chapter Storage SCP AE Specification.

4.2.3 Storage SCP AE Specification

4.2.3.1 SOP Classes

For SOP Classes supported, please refer to Table 1 "Network Service" Sections „Transfer“ on page 2.

4.2.3.2 Association Policies

4.2.3.2.1 General

The ACOM.PC will be able to receive SOP Instances from all DICOM nodes which are configured.

The default PDU size used will be 256 KB.

4.2.3.2.2 Number of Associations

The ACOM.PC DICOM application is able to receive SOP Instances through several associations at a time from different clients.

4.2.3.2.3 Asynchronous Nature

The ACOM.PC Server DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

4.2.3.2.4 Implementation Identifying Information

For Implementation Identifying Information please refer to Table 2 "Implementation Identifying Information" on page 2.

4.2.3.3 Association Acceptance Policy

The ACOM.PC DICOM application attempts to accept a new association for

- DIMSE C-ECHO
- DIMSE C-STORE

requests.

The ACOM.PC DICOM application will accept any number of verification or storage SOP classes that are listed above. There is no limit on the number of presentation contexts accepted except for the DICOM limit. In the event that the Siemens DICOM application runs out of resources, it will reject the association request.

ACOM.PC will only accept Associations from known hosts with a known AET. Hosts and AETs have to be entered in "Local Service" by a Siemens Service Engineer.

4.2.3.3.1 Activity – Save to local disk

4.2.3.3.1.1 Description and Sequencing of Activity

The ACOM.PC DICOM application will accept an association and will receive SOP Instances according to the listed presentation contexts on that association and will store the images to the local hard disk.

The DICOM receiver returns the status Success upon successfully operation otherwise one of the following status codes is returned:

Code	Meaning
A700	Refused: Lack of Resources (e.g. not enough disk space)
A900 or C000	An error occurred while processing the image, which makes it impossible to proceed. The image will not be stored

Table 8. Status codes “Receive Response”

4.2.3.3.1.2 Accepted Presentation Context

The ACOM.PC DICOM application will accept Presentation Contexts as shown in the following table:

Presentation Context Table – “Receive”				
Abstract Syntax	Transfer Syntax		Role	Ext. Neg.
Description	Name List	UID List		
Any image SOP Classes detailed in Chapter Table 1 "Network Service" Section „Transfer“ on page 2	JPEG Lossy Extended JPEG Lossless, Process 14 (selection value 1) JPEG Lossy Baseline (Process 1) Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCP	None
Any image SOP Classes detailed in Chapter Table 1 "Network Service" Section „Transfer Ultrasound“ on page 2	JPEG Lossy Extended JPEG Lossy Baseline (Process 1) Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian RLE lossless	1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2 1.2.840.10008.1.2.5	SCP	None
Any Non-Image SOP Classes detailed in Table 1 Network Service Section „Transfer“ on page 2, e.g. Waveforms	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCP	None
Private SOP Class detailed in Chapter Table 1 "Network Service" Section „Transfer (Private SOP Class)“ on page 2	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCP	None

Table 9. Presentation Context Table “Receive”

4.2.3.3.1.3 SOP specific Conformance

The ACOM.PC application conforms to the Full Storage Service Class at Level 2.

The DICOM images received by the ACOM.PC application may contain additional private elements. They are not discarded when stored to local hard disk (if received with an Explicit Value Representation). ACOM.PC will not convert private attributes either.

ACOM.PC will fill in missing offset tables for the JPEG transfer syntaxes when receiving the images. It will also create DICOMDIR objects for the images and generate the IconImageSQ items (Icon image size 128² or smaller depending on original image size).

ACOM.PC supports DSA only with Pixel Intensity Relationship = “LOG” and only “AVG_SUB” as Mask Mode (Single Frame Mask).

A C-STORE operation with status SUCCESS indicates that the image was successfully written to disk.

ACOM.PC is not supporting retired date and time formats when displaying information from DICOM objects stored. Non-Latin characters are discarded.

The order of preference in accepting Transfer Syntaxes within Presentation Contexts or Presentation Contexts with single Transfer Syntaxes is:

Order	DICOM Transfer Syntax
1	JPEG Lossy Extended
2	JPEG Lossless Non-hierarchical
3	JPEG Lossy Baseline
4	RLE Lossless
5	Explicit VR Little Endian
6	Implicit VR Little Endian

Table 10. Order of Preference Transfer Syntax

4.2.4 Retrieve SCU Specification

4.2.4.1 SOP Classes

The Query/Retrieve SCU requests the remote SCP to perform a match of all keys specified in the request identifier against the information in its database. Selecteded images will be moved over a different (C-MOVE) storage association.

For SOP Classes supported, please refer to Table 1 "Network Service" Section „Query/Retrieve“ on page 2.

4.2.4.2 Association Policies

4.2.4.2.1 General

The configuration of the ACOM.PC application defines the Application Entity Title and its port number.

The default PDU size used will be 256 KB.

4.2.4.2.2 Number of Associations

The ACOM.PC DICOM application initiates several associations at a time.

For Query it initiates a new association to the remote node and issues the C-FIND request to retrieve all the requested patient and study information matching the search criteria. ACOM.PC initiates in parallel a second association to the destination node to query for all the series information for each study information returned on the first association.

For the Retrieve request (C-MOVE) only one association is initiated per destination.

4.2.4.2.3 Asynchronous Nature

The ACOM.PC DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

4.2.4.2.4 Implementation Identifying Information

For Implementation Identifying Information please refer to Table 2 "Implementation Identifying Information" on page 2.

4.2.4.3 Association Initiation Policy

The ACOM.PC DICOM application will request associations for the following DIMSE-C operations as SCU:

Supported DIMSE operations	Cancel Request supported
C-FIND	yes
C-MOVE	n.a.

Table 11. Supported DIMSE-C Operations

Extended negotiation (relational query) is NOT supported for the above listed services.

4.2.4.3.1 Activity – FIND SCU

4.2.4.3.1.1 Description and Sequencing of Activity

Activity "Edit|Search..." or "Edit|Easy Search..."

"Edit|Search..." and "Edit|Easy Search..." initiates a C-FIND request. If the process successfully establishes an association to the remote Application Entity, it will send the query request for the patient and study information over the open association.

Subsequently the ACOM.PC will initiate a second association to the remote Application Entity. The second association will query in the background for the series information of each Study returned by the remote AE on the first association.

All Patient/Study/Series information is displayed in the User Interface of the ACOM.PC. The user can select a patient or a specific study/exam and ask for retrieval from the remote AE.

If the C-FIND Response from the remote Application contains an error status, the association is aborted.

If the remote node returns more results than the maximum number of matches (3000), then ACOM.PC will issue a C-FIND-CANCEL Request. If the remote AE still continues sending results, ACOM.PC will abort the association.

4.2.4.3.1.2 Proposed Presentation Contexts

The ACOM.PC Server DICOM application will propose Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Query/Retrieve Model Study Root - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None

Table 12. Presentation Context Table "Find"

4.2.4.3.1.3 SOP Specific Conformance

The ACOM.PC DICOM Query/Retrieve SCU supports hierarchical queries with all mandatory search keys. The following Table 13 describes the search keys for the Study Root query model that the ACOM.PC Query application supports as an SCU.

Attribute Name	Tag	Type	Matching	User Input	Return Value Display
Study Level ([0008,0052] = "STUDY")					
Specific character Set	(0008,0005)	O	Single Value	Fixed value ISO_IR 100	--
Referring Physician's Name	(0008,0090)	O	Universal(Null)	--	yes
Patient Name	(0010,0010)	R	Wildcard or Universal(Null)	Enter value	yes
Patient ID	(0010,0020)	U / R	Wildcard or Universal(Null)	Enter value	yes
Patient´s Birthdate	(0010,0030)	O	Single Value or Universal(Null)	Enter value	yes
Patient´s Sex	(0010,0040)	O	Wildcard or Universal(Null)	Enter value	yes
Patient Comments	(0010,4000)	O	Universal(Null)	--	yes

Attribute Name	Tag	Type	Matching	User Input	Return Value Display
Study Instance UID	(0020,000D)	U	Universal(Null)	--	--
Study ID	(0020,0010)	R	Wildcard or Universal(Null)	Enter value	yes
Study Date	(0008,0020)	R	Range or Universal(Null)	Enter value	yes
Study Time	(0008,0030)	R	Universal(Null)	--	yes
Accession Number	(0008,0050)	R	Wildcard or Universal(Null)	Enter value	yes
Study Description	(0008,1030)	O	Wildcard or Universal(Null)	Enter value	yes
Series Level ([0008,0052] = "SERIES")					
Specific character Set	(0008,0005)	O	Single Value	Fixed value ISO_IR 100	--
Series Instance UID	(0020,000E)	U	Single Value	--	--
Series Number	(0020,0011)	R	Universal(Null)	--	--
Modality	(0008,0060)	R	Single Value or Universal(Null)	Select value	yes
Performing Physician's Name	(0008,1050)	O	Wildcard or Universal(Null)	Enter value	yes
Series Date	(0008,0021)	O	Range or Universal(Null)	Enter value	yes
Series Time	(0008,0031)	O	Universal(Null)	--	yes
Series Description	(0008,103E)	O	Universal(Null)	--	--
Institution Name	(0008,0080)	O	Wildcard or Universal(Null)	Enter value	yes
Performed Procedure Step ID	(0040,0253)	O	Universal(Null)	--	--
Performed Procedure Step Start Date	(0040,0244)	O	Universal(Null)	--	-
Performed Procedure Step Start Time	(0040,0245)	O	Universal(Null)	--	-
Performed Procedure Step Description	(0040,0254)	O	Universal(Null)	--	--
Study Instance UID	(0020,000D)	U	Single Value	--	--

Table 13. C-FIND REQ Search Keys

Note: The Search on a DICOM device is Case Sensitive!

The ACOM.PC application completes the entered Search string for the Performing Physician with a leading and a trailing wildcard character (e.g. "*Name*").

If invoked by OpenInterface via Command Line, the ACOM.PC application will not add any wildcard character unless no text is specified for "Patient Name" and/or "Physician Name".

The ACOM.PC Search application supports the

- DIMSE C-FIND-CANCEL

The ACOM.PC Application issues a C-FIND-Cancel request if it receives more than the maximum number of matches (3000). If the remote AE still continues sending results then ACOM.PC will abort the association. The user can also cancel a running Query request via the ACOM.PC user interface ("Cancel" button while a Search is active).

The Find SCU interprets following status codes:

Service Status	Meaning	Error Codes	Related Fields
Refused	Out of Resources	A700	(0000,0902)
Failed	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902)
	Unable to process	Cxxx	(0000,0901) (0000,0902)
Cancel	Matching terminated due to Cancel request	FE00	None

Service Status	Meaning	Error Codes	Related Fields
Success	Matching is complete - No final Identifier is supplied	0000	None
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Identifier
	Matches are continuing - Warning that one or more Optional Keys were not supported for existence and/or matching for this identifier	FF01	Identifier

Table 14. Status Codes

After ACOM.PC application has received a C-FIND response with Status "Success" or "Cancel" it will close the associations.

4.2.4.3.2 Activity – MOVE SCU

4.2.4.3.2.1 Description and Sequencing of Activity

Activity File|Save…

“File|Save...” initiates a C-MOVE request for one or more selected patients/studies/exams in the User Interface.

ACOM.PC establishes an association to the remote Application Entity and requests the selection to be transferred.

Subsequently, the ACOM.PC DICOM application waits for the C-STORE Request from the remote AE and for the completion of the image transfer. Received images are stored to the “Save…” destination. After the remote AE has closed the association, the ACOM.PC User Interface is updated.

A separate C-MOVE request is issued for each series.

The Retrieve can be aborted by deleting the open jobs in the transfer queue. ACOM.PC (or ACOM.REC) will then finish the current C-MOVE for the current series but not issue any new C-MOVE requests. Instances already received during execution of the aborted job will not be stored in the database.

If the C-MOVE Response from the remote Application contains an error status, the association is aborted.

4.2.4.3.2.2 Proposed Presentation Contexts

The ACOM.PC Server DICOM application will propose Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Query/Retrieve Model Study Root – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None

Table 15. Presentation Context Table

Note: C-MOVE Extended Negotiation will NOT be supported by the SCU.

4.2.4.3.2.3 SOP Specific Conformance

The ACOM.PC DICOM Query/Retrieve SCU supports hierarchical queries with all mandatory search keys. The following Table 16 describes the matching keys for the supported query model that the ACOM.PC Retrieve application supports as an SCU.

Attribute Name	Tag	Type	Matching	User Input	Return Value Display
Study Level ([0008,0052] = "STUDY")					
Study Instance UID	(0020,000D)	U	List of UID	Select from list	--
Series Level ([0008,0052] = "SERIES")					
Study Instance UID	(0020,000D)	U	Single Value	Select from list	--
Series Instance UID	(0020,000E)	U	List of UID	Select from list	--
Image Level ([0008,0052] = "IMAGE")					
Study Instance UID	(0020,000D)	U	Single Value	Select from list	--
Series Instance UID	(0020,000E)	U	Single Value	Select from list	--
SOP Instance UID	(0008,0018)	U	List of UID	--	--

Table 16. Matching Keys

The ACOM.PC Application does not issue a C-MOVE-Cancel request.

The Move SCU interprets following status codes:

Service Status	Meaning	Error Codes	Related Fields
Refused	Out of Resources - Unable to calculate number of matches	A701	(0000,0902)
	Out of Resources - Unable to perform sub operations	A702	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
	Move destination unknown	A801	(0000,0902)
Failed	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902)
	Unable to process	Cxxx	(0000,0901) (0000,0902)
Cancel	Sub-operations terminated due to Cancel Indication	FE00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Warning	Sub-operations Complete - One or more Failures of Warnings	B000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Success	Sub-operations Complete - No Failures or Warning	0000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Pending	Sub-operations are continuing	FF00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)

Table 17. C-MOVE RSP Status Codes

ACOM.PC will display a Success message at the user interface only after receiving the C-MOVE Response status of ´Success´

4.3 Network Interfaces

4.3.1 Physical Network Interface

The DICOM Interface of the ACOM.PC provides DICOM TCP/IP Network Communication Support and uses the TCP/IP protocol stack from the operating system upon which executes. It uses the MergeCOM subroutine library. All available Ethernet interfaces are supported. Restrictions might occur for slow connections, e.g. 10baseT.

4.3.2 Additional Protocols

not applicable.

4.4 Configuration

4.4.1 AE Title/Presentation Address Mapping

Local AE Titles

Following the DICOM Standard, the AET string can be up to 16 characters long and must not contain any extended characters, only 7-bit ASCII characters (excluding Control Characters).

Application Entity	Role	TCP/IP Port
Verification SCP	SCP	104
Storage SCU	SCU	-
Storage SCP	SCP	104
Query/Retrieve SCU	SCU	-

Table 18. Default Port Settings

Remote AE Titles

All external AE Titles have to be configured to be able to communicate with ACOM.PC. ACOM.PC only allows communication with known nodes.

4.4.2 Controlling “Examination Split”

In the browser all series of one study that are from the same modality are displayed as one examination. Additionally, the MPPS ID attribute can be used as a criterion for splitting examinations in the Browser. This behavior can be turned on or off by using the Windows Registry key

HKEY_LOCAL_MACHINE\Software\Siemens\ACOM_GC\ExamCriteria.

Possible values are:

Registry Key	Behavior
0	MPPS ID is NOT used as exam buildup criterion
1	MPPS ID is used as exam buildup criterion

Table 19. Examination Split ID

If the key does not exist, the MPPS ID is not used for build up the study examinations. After initial installation of ACOM.PC the key is not created.

4.4.3 Parameters

All remote node configuration parameters are as follows:

Time-out Values		
Parameter	**Value [sec]**	**Comment**
Accepting/Rejecting an Association Request	240	Wait for an Association Request or wait for a Peer to shut down the Association
Association Open Request	240	Wait for a reply to an Association Accept Request
Association Close Request	120	Wait for a reply to an Association Release Request
Accepting a Message over Network	120	Wait for a Network Write to be accepted
Waiting for Data between TCP/IP Packets	120	Wait for Data between TCP/IP packets
Response from Remote Node for Storage/Query/Retrieve	120	Time between Service Request and Service Response

Table 20. Time-Out Values

5 Application Profile Conformance Statement

The following "Offline Media Application Profiles (incl. private extensions)" are supported by ACOM.PC and ACOM.REC. Subsequently, ACOM.PC and ACOM.REC will be referred to as ACOM Media Application.

Application Profile
Basic Cardiac
1024 Extended Cardiac
General Purpose
M.A.S. private Application Profile
ACOM.Rec augmented Profile

Table 21. Supported Application Profiles

5.1 Implementation Model

5.1.1 Application Data Flow Diagram

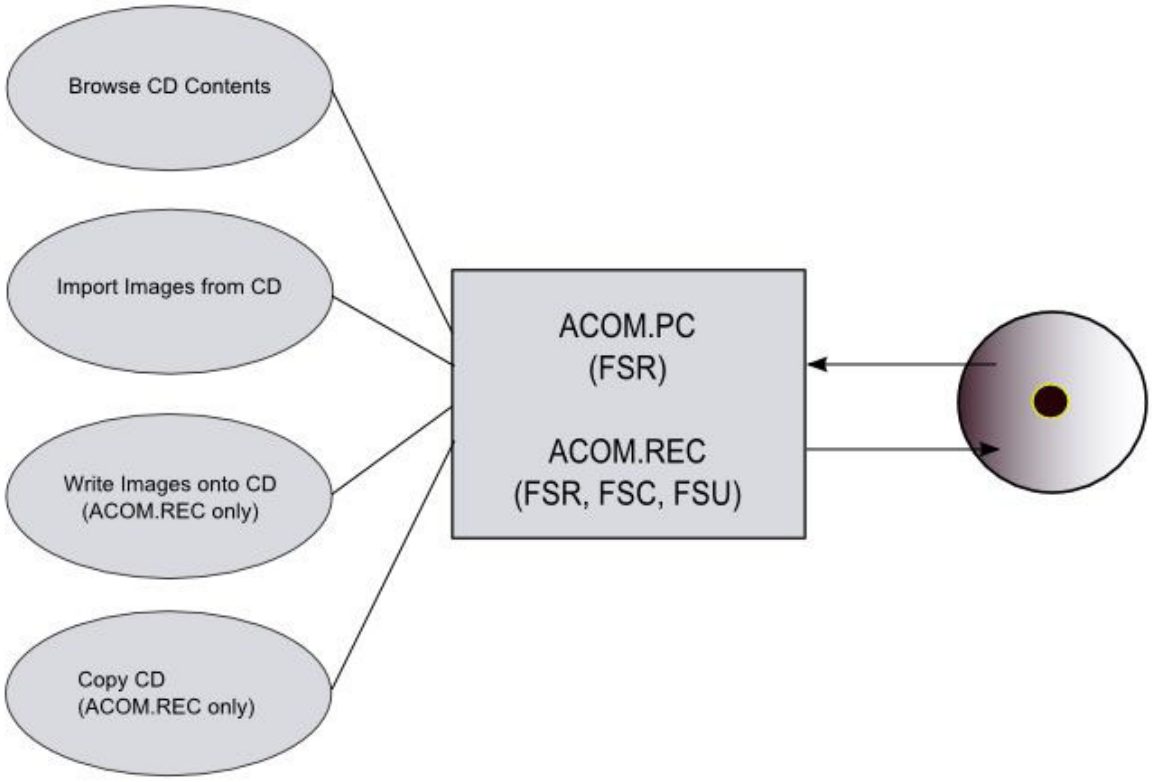

Table 22. Application Data Flow Diagram ACOM Media Application

The DICOM archive application will serve as an interface to offline media. It serves interfaces to include the offline media directory into the browser and to copy SOP instances to a medium or retrieve SOP Instances from medium into local storage.

The DICOM Archive application will support the 120mm CD medium, DVD-R/RW and DVD+R/RW.

5.1.2 Functional Definitions of AEs

The ACOM Media Application product DICOM off-line media storage application includes all interfaces to access off-line media. It is capable of

- Reading the File-sets DICOMDIR information temporarily into the browser.
- Importing the File-sets from medium into local storage or transfer to DICOM destination.
- Copy an existing medium directly onto an empty medium.
- Creating a new File-set onto an unwritten medium.
- Updating an existing File-set by writing new SOP Instances onto the medium.

5.1.3 Activities

5.1.3.1 Description and Sequencing of Activity FSR

The ACOM Media Application will not perform transfers until the Directory information of the DICOMDIR is completely read in and displayed in the Browser.

5.1.4 Implementation Identifying Information

For Implementation Identifying Information please refer to Table 2 "Implementation Identifying Information" on page 2.

5.2 AE Specifications

5.2.1 DICOM Archive Specification

The DICOM Archive provides Standard conformance to Media Storage Service Class (Interchange Option). Details are listed in following Table:

Application Profiles	Activity	Role	Application
STD-GEN-CD/DVD/DVD	Browse Directory Information Import Images from CD Export to Local Archive Media Copy existing media onto new one	FSR FSR FSC, FSU FSC	ACOM Media Application
AUG-GEN-CD/DVD/DVD			
STD-XABC-CD/DVD/DVD			
AUG-XABC-DYNAMIC-CD/DVD/DVD			
STD-XA1K-CD/DVD/DVD			
PRI-XAMAS-CD/DVD/DVD			
PRI-AREC-CD/DVD/DVD			
STD-US-ID-SF-CD/DVD/DVD	Browse Directory Information and Import Images from CD	FSR	ACOM.PC
STD-US-ID-MF-CD/DVD/DVD			

Table 23. Application Profiles supported

The STD-XABC-CD/DVD/DVD application profile is used when writing images from the ACOM.PC local directory onto a MEDIUM or also when copying a medium written in STD-XABC-CD/DVD/DVD profile. The augmented AUG-XABC-DYNAMIC-CD/DVD/DVD profile is only used when copying media written in AUG-XABC-DYNAMIC-CD/DVD profile (for example by an ACOM.M® product).

5.2.1.1 File Meta Information for the Application Entity

The Source Application Entity Title is set to that of the ACOM.PC application, but the application is not modifying the contents of a medium. This function is only provided by the ACOM.REC application.

5.2.1.2 Activity "Browse Directory Information"

The ACOM Media Application acts as FSR and reads the DICOMDIR file as soon as a DICOM medium is inserted into the drive. The DICOMDIR contents are evaluated and the Patients listed in the Patient Browser. When a Patient entry is selected in this Patient Browser then the corresponding information about the studies on a medium is displayed in the Study Browser.

The ACOM.PC application supports value precedence of a Detached Patient Management instance.

ACOM.PC is not supporting retired date and time formats when displaying information from DICOM objects stored on medium.

5.2.1.3 Activity "Import Images from CD/DVD"

The ACOM Media Application acts as an FSR when requested to read Images from media. If requested, it will write images to the local storage or a network drive or a dedicated ACOM Server.

If Detached Patient Management objects are present, the new values from those objects take precedence over the image attributes when the images are sent over network. When only importing into local storage or network drive, the Detached Patient Management objects are only imported and no changes are applied to any image object instances.

Standalone IODs (Standalone Overlay, Standalone Curve, …) are not supported.

5.2.1.4 Activity "Export to Local Archive Media"

The ACOM.REC application acts as an FSU (for media with existing DICOM file-set) or FSC (for not-initialized media) when requested to write Images to the local archive medium (CD-R and DVD supported).
In case of new media (media not initialized) it will create a DICOMDIR file on the medium or otherwise (already existing DICOM file-set on medium) it will update the existing DICOMDIR file when writing the new SOP Instances to medium. ACOM.REC allows anonymizing the data when writing onto media (see separate section 5.3.5 for more details).
The ACOM.REC application will not close the medium.
ACOM.REC can also burn a DICOM viewer onto the medium with the images. This DICOM viewer will be automatically started when such a medium is inserted into a PC which has the autostart option enabled for the drive and does not have the ACOM.PC Viewer installed.

5.2.1.5 Activity "Copy Media"

The ACOM.REC application acts as an FSC when requested to copy a local medium onto a new empty archive medium (CD-R and DVD supported). It will copy all files (including DICOMDIR) without modification.
ACOM.REC application will copy only media containing DICOM File-sets so at least a DICOMDIR file has to be present, otherwise the copy operation will be rejected.

5.3 Application Profiles

5.3.1 DICOMDIR Keys

The DICOMDIR file will contain the following attributes for the levels Patient – Study – Series – Image/Waveform/Private for the new SOP instances written by ACOM.Rec® application:

Attribute Name	Tag	Type	Notes
File-Set Meta information			
File Meta Information Version	(0002,0001)	1	00 01
Media Storage SOP Class UID	(0002,0002)	1	Media Storage Directory SOP Class
Media Storage SOP Instance UID	(0002,0003)	1	
Transfer Syntax UID	(0002,0010)	1	Explicit VR Little Endian
Implementation Class UID	(0002,0012)	1	
Implementation Version Name	(0002,0013)	3	
Source Application Entity Title	(0002,0016)	3	ACOM_REC_20
File-Set identification			
File-set ID	(0004,1130)	2	ACOM_PC_40
Directory information			
Offset of the First Directory Record of the Root Directory Entry	(0004,1200)	1	
Offset of the Last Directory Record of the Root Directory Entity	(0004,1202)	1	
File-set Consistency Flag	(0004,1212)	1	0000H
Directory Record Sequence	(0004,1220)	2	
> Offset of the Next Directory Record	(0004,1400)	1C	
> Record In-use flag	(0004,1410)	1C	FFFFH
> Offset of Referenced Lower-Level Directory Entity	(0004,1420)	1C	
> Directory Record Type	(0004,1430)	1C	PATIENT, STUDY, SERIES, IMAGE, PRIVATE, WAVEFORM
> Private Record UID	(0004,1432)	1C	Required for Directory Record type PRIVATE
> Referenced File ID	(0004,1500)	1C	contains the filename on media for the Directory Record of Type IMAGE or PRIVATE
> Referenced SOP Class UID in File	(0004,1510)	1C	for the Directory Record of Type IMAGE or PRIVATE
> Referenced SOP Instance UID in File	(0004,1511)	1C	for the Directory Record of Type IMAGE or PRIVATE
> Referenced Transfer Syntax UID in File	(0004,1512)	1C	for the Directory Record of Type IMAGE or PRIVATE
> Record Selection Keys	see below		

Attribute Name	Tag	Type	Notes
Patient Keys			**Directory Record Type PATIENT**
Specific Character Set	(0008,0005)	1C	
Patient's Name	(0010,0010)	2	
Patient ID	(0010,0020)	1	
Date Of Birth	(0010,0030)	2	
Patient's Sex	(0010,0040)	2	
Study Keys			**Directory Record Type STUDY**
Specific Character Set	(0008,0005)	1C	
Study Date	(0008,0020)	1	
Study Time	(0008,0030)	1	
Accession Number	(0008,0050)	2	
Referring Physician's Name	(0008,0090)	3	
Study Description	(0008,1030)	2	
PrivateCreator	(0009,0010)	3	"CARDIO-SMS 1.0"
ACOM flags	(0009,1008)	3	Hex 7\10004\10004\7
Study Instance UID	(0020,000D)	1	
Study ID	(0020,0010)	1	Must be filled by data set creator
Series Keys			**Directory Record Type SERIES**
Specific Character Set	(0008,0005)	1C	
Modality	(0008,0060)	1	
Institution name	(0008,0080)	2	
Institution Address	(0008,0081)	2	Required by STD-XABC-CD/DVD profile
Performing Physician's Name	(0008,1050)	2	
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	1	
Image Keys			**Directory Record Type IMAGE**
Specific Character Set	(0008,0005)	1C	
Image Type	(0008,0008)	1	
Referenced Image Sequence	(0008,1140)	1C	Required if associated Biplane image exists
> Referenced SOP Class UID	(0008,1150)	1C	
> Referenced SOP Instance UID	(0008,1155)	1C	
SOP Class UID	(0008,1150)	3	
SOP Instance UID	(0008,1155)	3	

Attribute Name	Tag	Type	Notes
Private Creator	(0009,0010)	1C	"CARDIO-D.R. 1.0" required if Alternate Image Sequence is present
Alternate Image Sequence	(0009,xx40)	1C	Required by AUG-XABC-DYNAMIC-CD/DVD profile if associated Lossy Directory Record exists
> Referenced SOP Class UID	(0008,1150)	1C	
> Referenced SOP Instance UID	(0008,1155)	1C	
Frame Time	(0018,1063)	3	
Positioner Motion	(0018,1500)	3	Used in AUG-XABC-DYNAMIC-CD/DVD profile
Positioner Primary Angle	(0018, 1510)	3	
Positioner Secondary Angle	(0018, 1511)	3	
Image Number	(0020,0013)	1	
Number of Frames	(0028,0008)	3	
Frame Increment Pointer	(0028,0009)	3	
Calibration image	(0050,0004)	2	Required by STD-XABC-CD/DVD profile
Icon Image Sequence	(0088,0200)	1	Required for STD-XABC-CD/DVD Application profile
> Samples per Pixel	(0028,0002)		1
> Photometric Interpretation	(0028,0004)		MONOCHROME2 or Palette Color (for US)
> Rows	(0028,0010)		128 if image rows or columns is > 128, 64 otherwise
> Columns	(0028,0011)		128 if image rows or columns is > 128, 64 otherwise
> Bits Allocated	(0028,0100)		8
> Bits Stored	(0028,0101)		8
> High Bit	(0028,0102)		7
> Pixel Representation	(0028,0103)		0 (unsigned)
> Pixel Data	(7FE0,0010)		Icon Image pixel data
Dynaview Image Keys			**Directory Record Type PRIVATE**
Specific Character Set	(0008,0005)	1C	
Image Type	(0008,0008)	1	
Referenced Image Sequence	(0008,1140)	1C	Required if associated Biplane image exists
> Referenced SOP Class UID	(0008,1150)	1C	
> Referenced SOP Instance UID	(0008,1155)	1C	
Source Image Sequence	(0008,2112)	1	Required by AUG-XABC-DYNAMIC-CD/DVD profile for lossy Dynaview image to reference the corresponding JPEG lossless compressed image
> Referenced SOP Class UID	(0008,1150)	1C	
> Referenced SOP Instance UID	(0008,1155)	1C	
Frame Time	(0018,1063)	3	
Positioner Motion	(0018,1500)	3	
Positioner Primary Angle	(0018, 1510)	3	

Attribute Name	Tag	Type	Notes
Positioner Secondary Angle	(0018, 1511)	3	
Image Number	(0020,0013)	1	
Number of Frames	(0028,0008)	3	
Icon Image Sequence	(0088,0200)	3	Optional in AUG-XABC-DYNAMIC-CD/DVD Application profile
> Samples per Pixel	(0028,0002)		1
> Photometric Interpretation	(0028,0004)		MONOCHROME2
> Rows	(0028,0010)		128
> Columns	(0028,0011)		128
> Bits Allocated	(0028,0100)		8
> Bits Stored	(0028,0101)		8
> High Bit	(0028,0102)		7
> Pixel Representation	(0028,0103)		0 (unsigned)
> Pixel Data	(7FE0,0010)		Icon Image pixel data
Waveform Keys			**Directory Record Type WAVEFORM**
Specific Character Set	(0008,0005)	1C	
Content Date	(0008,0023)	1	
Content Time	(0008,0033)	1	
Instance Number	(0020,0013)	1	
HICOR/ACOM Report Keys			**Directory Record Type PRIVATE**
Specific Character Set	(0008,0005)	1C	
Image Type	(0008,0008)	1	"ORIGINAL\PRIMARY\SINGLE PLANE\SINGLE A"
Positioner Motion	(0018,1500)	3	NULL length
Positioner Primary Angle	(0018, 1510)	3	
Positioner Secondary Angle	(0018, 1511)	3	
Image Number	(0020,0013)	1	
Number of Frames	(0028,0008)	3	"1" (stored as XA IOD with only one frame)
syngo CsaNonImage Keys			**Directory Record Type IMAGE**
Specific Character Set	(0008,0005)	1C	
Image Type	(0008,0008)	3	
Acquisition Number	(0020,0012)	3	
Private Creator	(0029,0010)	1	"SIEMENS CSA NON-IMAGE"
Syngo Data Type	(0029,1008)	1	Syngo Data identification
Syngo Data Version	(0029,1009)	3	Version information

Table 24. DICOMDIR Keys

The AUG-XABC-DYNAMIC-CD/DVD Augmented Application Profile utilizes the same requirements for the Directory information in DICOMDIR as the STD-XABC-CD/DVD Application Profile with the addition that Directory Records associated with Dynaview Lossy XA Image IODs shall exist as Private Directory Records.

5.3.2 Standard Application Profiles

5.3.2.1 STD-GEN-CD/DVD

For media conforming to the STD-GEN-CD/DVD Profile the following SOP classes will be supported as an FSR:

Information Object Definition	SOP Class UID	Transfer Syntax UID
Nuclear Medicine Image	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	
Ultrasound multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	
Detached Patient Management	1.2.840.10008.3.1.2.1.1	

Table 25. Application Profile STD-GEN-CD/DVD

5.3.2.2 STD-XABC-CD/DVD

For media conforming to the STD-XABC-CD/DVD Profile the following SOP classes will be supported as an FSR:

Information Object Definitions	SOP Class UID	Transfer Syntax and UID	FSC	FSR	FSU
XA Image	1.2.840.10008.5.1.4.1.1.12.1	JPEG lossless Process 14 1.2.840.10008.1.2.4.70	Yes	Yes	Yes
Detached Patient Management	1.2.840.10008.3.1.2.1.1	Explicit VR Little Endian 1.2.840.10008.1.2.1	No	Yes	No

Table 26. Application Profile STD-XABC-CD/DVD

5.3.2.3 STD-XA1k-CD/DVD

For media conforming to the STD-XA1k-CD/DVD Profile the following SOP classes will be supported as an FSR:

Information Object Definitions	SOP Class UID	Transfer Syntax and UID	FSC	FSR	FSU
XA Image	1.2.840.10008.5.1.4.1.1.12.1	JPEG lossless Process 14 1.2.840.10008.1.2.4.70	Yes	Yes	Yes
SC Image	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian 1.2.840.10008.1.2.1	Yes	Yes	Yes
Detached Patient Management	1.2.840.10008.3.1.2.1.1		No	Yes	No

Table 27. Application Profile STD-XA1k-CD/DVD

5.3.2.4 STD-US-ID-SF-CD/DVD, STD-US-ID-MF-CD/DVD

For media conforming to the STD-US-ID-SF-CD/DVD and STD-US-ID-MF-CD/DVD Profiles the following SOP classes will be supported as an FSR:

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian 1.2.840.10008.1.2.1 RLE lossless 1.2.840.10008.1.2.5 JPEG Lossy Baseline (8 Bit) 1.2.840.10008.1.2.4.50	Yes	No	No
Ultrasound multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1				

Table 28. Application Profiles STD-US-ID-SF-CD/DVD, STD-US-ID-MF-CD/DVD

5.3.3 Augmented Application Profiles

5.3.3.1 AUG-XABC-DYNAMIC-CD/DVD

Depending on the Viewer Preferences->'Display Dynaview if available', the ACOM.PC application will make use of the lossy compressed Dynaview Image Object for immediate review ("First Pass").

Depending on the
- Browser Preferences->Local->'Preload Dynaview' and/or
- Browser Preferences->Network->'Preload Dynaview'

configuration, the Lossy Dynaview images will be additionally imported.

Information Object Definitions	SOP Class UID	Transfer Syntax and UID	FSC	FSR	FSU
XA Image	1.2.840.10008.5.1.4.1.1.12.1	JPEG lossless Process 14 1.2.840.10008.1.2.4.70	Yes	Yes	Yes
Detached Patient Management	1.2.840.10008.3.1.2.1.1	Explicit VR Little Endian 1.2.840.10008.1.2.1	No	Yes	No

Table 29. Application Profile AUG-XABC-DYNAMIC-CD/DVD

5.3.3.2 AUG-GEN-CD/DVD

For media conforming to an AUG-GEN-CD/DVD Profile the following SOP classes will be supported as an FSR:

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	see Table 31 RLE lossless 1.2.840.10008.1.2.5	Yes	Yes	Yes
Ultrasound multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	see Table 31 RLE lossless 1.2.840.10008.1.2.5			
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	see Table 31			
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	see Table 31			
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	see Table 31			
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	see Table 31			
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Explicit VR Little Endian 1.2.840.10008.1.2.1			

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Explicit VR Little Endian 1.2.840.10008.1.2.1			
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Explicit VR Little Endian 1.2.840.10008.1.2.1			
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Explicit VR Little Endian 1.2.840.10008.1.2.1			
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Explicit VR Little Endian 1.2.840.10008.1.2.1			
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Explicit VR Little Endian 1.2.840.10008.1.2.1			
Detached Patient Management	1.2.840.10008.3.1.2.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	No	Yes	No

Table 30. Application Profile AUG-GEN-CD/DVD

Transfer Syntax Name	Transfer Syntax UID
Explicit VR Little Endian JPEG Lossless, Process 14 JPEG Lossy Baseline (8 Bit) JPEG Lossy Extended (12 Bit)	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.70 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51

Table 31. Transfer Syntax supported

5.3.4 Private Application Profiles

5.3.4.1 PRI-XAMAS-CD/DVD

The media application is capable of reading media that are conforming to the PRI-XAMAS application profile class. Information about this profile is provided with the Modalities (e.g. AXIOM Artis) that create such media.

5.3.4.2 PRI-AREC-CD/DVD

The media application is capable of reading media that are conforming to the PRI-AREC-CD/DVD application profile. Information about this profile is provided with the ACOM.Rec® product SW that creates such media.

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	see Table 31 RLE lossless 1.2.840.10008.1.2.5	Yes	Yes	Yes
Ultrasound multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	see Table 31 RLE lossless 1.2.840.10008.1.2.5			
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	see Table 31			
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	see Table 31			
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	see Table 31			
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	see Table 31			
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Explicit VR Little Endian 1.2.840.10008.1.2.1			

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Explicit VR Little Endian 1.2.840.10008.1.2.1			
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Explicit VR Little Endian 1.2.840.10008.1.2.1			
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Explicit VR Little Endian 1.2.840.10008.1.2.1			
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Explicit VR Little Endian 1.2.840.10008.1.2.1			
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Explicit VR Little Endian 1.2.840.10008.1.2.1			
CSA Non-Image Storage	1.3.12.2.1107.5.9.1	Explicit VR Little Endian 1.2.840.10008.1.2.1			
Detached Patient Management	1.2.840.10008.3.1.2.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1			

Table 32. Application Profile PRI-AREC-CD/DVD

5.3.5 Anonymizing of patient data

ACOM.REC 4.0 can also write patient data in an anonymized way onto media. The DICOM data are modified on the fly according to following table:

Attribute Name	Tag	Type	Change
Instance Creator UID	(0008,0014)	3	Attribute deleted
SOP Instance UID	(0008,0018)		New value
Accession Number	(0008,0050)	2	Value deleted
Institution Name	(0008,0080)	2	Value deleted
Institution Address	(0008,0081)	2	Value deleted
Referring Physician's Name	(0008,0090)	3	Attribute deleted
Referring Physician's Address	(0008,0092)		Value deleted
Referring Physician's Telephone Numbers	(0008,0094)		Value deleted
Station Name	(0008,1010)	3	Attribute deleted
Study Description	(0008,1030)	2	Remains unchanged
Series Description	(0008,103E)	3	Remains unchanged
Institutional Department Name	(0008,1040)	3	Remains unchanged
Physician(s) of Record	(0008,1048)	3	Attribute deleted
Performing Physicians' Name	(0008,1050)	2	Value deleted
Name of Physician(s) Reading Study	(0008,1060)	3	Attribute deleted
Operators' Name	(0008,1070)	2	Value deleted
Admitting Diagnoses Description	(0008,1080)	3	Attribute deleted
Referenced SOP Instance UID	(0008,1155)	1C	Value deleted
Derivation Description	(0008,2111)	3	Attribute deleted
Patient's Name	(0010,0010)	2	From user input (Default: "").
Patient ID	(0010,0020)	1	From user input (Default: "xx").
Patient's Birth Date	(0010,0030)	2	Value is deleted but before the patient's Age is calculated and stored in Patient's Age (0010,1010)
Patient's Birth Time	(0010,0032)	3	Attribute deleted

Attribute Name	Tag	Type	Change
Patient's Sex	(0010,0040)	2	Remains unchanged
Other Patient Ids	(0010,1000)	3	Attribute deleted
Other Patient Names	(0010,1001)	3	Attribute deleted
Patient's Age	(0010,1010)	3	Calculated from Patient's Birth Date (0010,0030)
Patient's Size	(0010,1020)	3	Remains unchanged
Patient's Weight	(0010,1030)	3	Remains unchanged
Patient's Address	(0010,1040)	3	Attribute deleted
Military Rank	(0010,1080)	3	Attribute deleted
Medical Record Locator	(0010,1090)		Value deleted
Ethnic Group	(0010,2160)	3	Attribute deleted
Occupation	(0010,2180)	3	Attribute deleted
Additional Patient's History	(0010,21B0)	3	Attribute deleted
Patient Comments	(0010,4000)	3	Attribute deleted
Device Serial Number	(0018,1000)	2 or 3	Value deleted
Protocol Name	(0018,1030)	3	Attribute deleted
Study Instance UID	(0020,000D)	1	New UID created
Series Instance UID	(0020,000E)	1	New UID created
Study ID	(0020,0010)	1	Changed to "xx"
Frame of Reference UID	(0020,0052)	1 or 1C	Value deleted
Synchronization Frame of Reference UID	(0020,0200)	1	Value deleted
Image Comments	(0020,4000)	3	Attribute deleted
Requesting Physician	(0032,1032)	3	Attribute deleted
Request Attributes Sequence	(0040,0275)	3	Attribute deleted
UID	(0040,A124)	1C	Value deleted
Content Sequence	(0040,A730)	1C	Value deleted
Storage Media File-set UID	(0088,0140)	2C or 3	Value deleted
Referenced Frame of Reference UID	(3006,0024)	1C	Value deleted
Related Frame of Reference UID	(3006,00C2)	1C	Value deleted

Table 33. Anonymizing of Patient Data

5.4 Extensions, Specializations and Privatizations of SOP Classes and Transfer Syntaxes

The SOP Classes listed refer in majority to those created by the equipment to which this Conformance Statement is related. For SOP classes not listed in this section, please refer to the Storage section of the DICOM Conformance Statement of the product. This will include all SOP Instances that can be received and displayed and therefore will be included into offline media storage even though these SOP Instances are not created by the equipment serving the Media Storage Service.

5.4.1 SOP Specific Conformance Statement for Basic Directory

5.4.1.1 Extension, Specialization for SIEMENS Non-Image Objects

According to the PRI-XAMAS Application Profile Class the usage of the Private Creator UIDs and further optional keys for the Directory Records referring to SIEMENS Non-Image Objects are listed in the following table.

Attribute	Tag	Value used
Private Record UID	(0004,1432)	1.3.12.2.1107.5.9.1
SOP Class UID	(0008,0016)	1.3.12.2.1107.5.9.1

Table 34. Private Creator UID

Those Non-Images will be ignored by ACOM.PC Archive implementation for the following activities

- Browse directory information
- Import Images from medium

5.4.2 Standard Extensions of XA Storage SOP classes

When exchanged under the AUG-XABC-DYNAMIC-CD/DVD Augmented Application Profile, the lossless and lossy XA image IODs shall contain, in addition to the attributes required for the XA image IOD in the STD-XABC-CD/DVD application profile, the attributes listed in the following table:

Attribute Name	Tag	Type (lossless)	Type (lossy)	Notes
Edge Enhancement Sequence	(0029,xx00)	1	1	Private Creator "CARDIO-D.R. 1.0"
> Private Creator	(0029,00xx)	1	1	"CARDIO-D.R. 1.0"
> Convolution Kernel Size	(0029,xx01)	1	1	Number of rows\columns in the convolution kernel
> Convolution Kernel coefficients	(0029,xx02)	1	1	The coefficients organized by row from left to right starting with the top row.
> Edge Enhancement Gain	(0029,xx03)	1	1	
Alternate Image Sequence	(0009,xx40)	1	-	Used in lossless image to reference the corresponding lossy image
> Referenced SOP Class UID	(0008,1150)	1		

Attribute Name	Tag	Type (lossless)	Type (lossy)	Notes
> Referenced SOP Instance UID	(0008,1155)	1		
Source Image Sequence	(0008,2112)	-	1	Used in lossy image to reference the corresponding lossless image
> Referenced SOP Class UID	(0008,1150)		1	
> Referenced SOP Instance UID	(0008,1155)		1	

Table 35. AUG-XABC-DYNAMIC-CD/DVD Augmented Application Profile

5.5 Configuration

5.5.1 Dynaview Image handling

5.5.1.1 Browser

From ‘Browser Preferences’ configuration, the following two configuration items control transfer of Lossy Dynaview images:

- Local->’Preload Dynaview’: Checked = Lossy Dynaview included in transfer to Local
- Network->’Preload Dynaview’: Checked = Lossy Dynaview included in transfer to net-share.

5.5.1.2 Viewer

From ‘Viewer Preferences’ configuration, the following configuration item controls handling of Lossy Dynaview images for viewing:

- ->’Display Dynaview if available’ –
  Checked = Lossy Dynaviews will be used for First Pass viewing.
  Not checked = (original) Image is used for First Pass viewing.

5.5.2 AE Title Mapping

When creating a new File-set on media or updating an existing File-set then ACOM.REC will set the Source Application Entity Title in the DICOMDIR to the AET of the own ACOM.REC application (own AET of the Storage SCP, configurable).

6 Support of Extended Character Sets

The ACOM.PC network application and the offline profiles support the ISO 8859 Latin 1 (ISO-IR 100) character set.

DICOM Character Set	Comment	Text Display
ISO_IR 100	ISO 8859 Latin 1	Support of text display in browser and viewer of the related ACOM.PC clients

Table 36. Supported Character Sets

Note: Non-Latin characters may not be displayed properly.

Annex A: SC Image by ACOM.PC Viewer

The function “Image|Export to DICOM” sends the image currently viewed to a DICOM destination. A processed SC image is created prior to sending. The following table gives an overview of the supplied attributes:

Attribute Name	Tag	Value
Image Type	(0008,0008)	from Original>
SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.7
SOP Instance UID	(0008,0018)	created new
Study Date	(0008,0020)	from Original
Series Date	(0008,0021)	from Original
Study Time	(0008,0030)	from Original
Series Time	(0008,0031)	from Original
Modality	(0008,0060)	from Original
Institution Name	(0008,0080)	from Original
Referring Physician’s Name	(0008,0090)	from Original
Study Description	(0008,1030)	from Original
Series Description	(0008,103E)	from Original
Performing Physician’s Name	(0008,1050)	from Original
Patient’s Name	(0010,0010)	from Original
Patient ID	(0010,0020)	from Original
Patient’s Birth Date	(0010,0030)	from Original
Patient’s Sex	(0010,0040)	from Original
Patient’s Size	(0010,1020)	from Original
Patient’s Weight	(0010,1030)	from Original
Patient Comments	(0010,4000)	from Original
Study Instance UID	(0020,000D)	from Original
Series Instance UID	(0020,000E)	from Original
Study ID	(0020,0010)	from Original
Samples per Pixel	(0028,0002)	from Original
Photometric Interpretation	(0028,0004)	from Original
Rows	(0028,0010)	from Original
Columns	(0028,0011)	from Original
Bits Allocated	(0028,0100)	from Original
Bits Stored	(0028,0101)	from Original
High Bit	(0028,0102)	from Original
Pixel Representation	(0028,0103)	from Original
Window Center	(0028,1050)	
Window Width	(0028,1051)	
Red Palette Color Lookup Table Descriptor	(0028,1101)	from Original, if required
Green Palette Color Lookup Table Descriptor	(0028,1102)	from Original, if required
Blue Palette Color Lookup Table Descriptor	(0028,1103)	from Original, if required
Red Palette Color Lookup Table Data	(0028,1201)	from original, if required
Green Palette Color Lookup Table Data	(0028,1202)	from original, if required
Blue Palette Color Lookup Table Data	(0028,1203)	from original, if required
Lossy Image Compression Flag	(0028,2110)	from Original
Pixel Data	(7FE0,0010)	

Table 37. SC Attributes supported

Annex B: Index of Tables

Table 1. Network Services 2
Table 2. Implementation Identifying Information 2
Table 3. Revision History 5
Table 4. ACOM.PC DICOM Data Flow Diagram 7
Table 5. Presentation Context Table “Verification” 10
Table 6. Presentation Context Table “File Save” 13
Table 7. Presentation Context Table “Image Export” 14
Table 8. Status codes “Receive Response” 16
Table 9. Presentation Context Table “Receive” 16
Table 10. Order of Preference Transfer Syntax 17
Table 11. Supported DIMSE-C Operations 18
Table 12. Presentation Context Table “Find” 19
Table 13. C-FIND REQ Search Keys 20
Table 14. Status Codes 21
Table 15. Presentation Context Table 21
Table 16. Matching Keys 22
Table 17. C-MOVE RSP Status Codes 22
Table 18. Default Port Settings 24
Table 19. Examination Split ID 24
Table 20. Time-Out Values 25
Table 21. Supported Application Profiles 26
Table 22. Application Data Flow Diagram ACOM Media Application 26
Table 23. Application Profiles supported 28
Table 24. DICOMDIR Keys 33
Table 25. Application Profile STD-GEN-CD/DVD 34
Table 26. Application Profile STD-XABC-CD/DVD 34
Table 27. Application Profile STD-XA1k-CD/DVD 34
Table 28. Application Profiles STD-US-ID-SF-CD/DVD, STD-US-ID-MF-CD/DVD 35
Table 29. Application Profile AUG-XABC-DYNAMIC-CD/DVD 35
Table 30. Application Profile AUG-GEN-CD/DVD 36
Table 31. Transfer Syntax supported 36
Table 32. Application Profile PRI-AREC-CD/DVD 37
Table 33. Anonymizing of Patient Data 38
Table 34. Private Creator UID 39
Table 35. AUG-XABC-DYNAMIC-CD/DVD Augmented Application Profile 40
Table 36. Supported Character Sets 42
Table 37. SC Attributes supported 43